

AMENDMENTS TO THE CLAIMS

1-11. (Cancelled)

12. (New) An isolated phenol oxidase enzyme or isolated laccase enzyme,
wherein said enzyme catalyzes oxidation of N,N-dimethyl-para-phenylenediamine, ortho-aminophenol, 2,6-dimethoxyphenol, 1,3-dihydroxynaphthol, and 4-hydroxyindole,
wherein said enzyme catalyzes polymerization of alkali extract of lignin,
wherein said enzyme optimally catalyzes the polymerization in an environment having a pH of 5.0 to 7.0, and

wherein said enzyme is selected from the group consisting of:

(a) an enzyme of a molecular weight of 28 kDa, wherein said molecular weight is determined by SDS-PAGE, wherein said enzyme maintains at least 70% activity from pH 8.0 to pH 9.0 for 20 hours at 30 °C, wherein said enzyme exhibits activity between 30 °C and 50 °C, wherein said enzyme maintains at least 80 % activity at 0° to 30°C for 1 hour at a pH of 7.0, wherein said enzyme maintains at least 90 % at 0 to 30°C for 1 hour at a pH of 9.0, and wherein said enzyme has an isoelectric point of about 7.4;

(b) an enzyme of a molecular weight of 35 kDa, wherein said molecular weight is determined by SDS-PAGE, wherein said enzyme maintains at least 75% activity from pH 7.0 to pH 10.0 for 20 hours at 30 °C, wherein said enzyme exhibits activity between 30 °C and 60 °C, wherein said enzyme maintains at least 90 % activity at 0° to 50°C for 1 hour at a pH of 7.0,

wherein said enzyme maintains at least 70 % at 0 to 50°C for 1 hour at a pH of 9.0, and wherein said enzyme has an isoelectric point of about 6.8; and

(c) an enzyme of a molecular weight of 45 kDa, wherein said molecular weight is determined by SDS-PAGE, wherein said enzyme maintains at least 70% activity from pH 8.0 to pH 10.0 for 20 hours at 30 °C, wherein said enzyme exhibits activity between 30 °C and 60 °C, wherein said enzyme maintains at least 80 % activity at 0° to 30°C for 1 hour at a pH of 7.0, wherein said enzyme maintains at least 90 % at 0 to 40°C for 1 hour at a pH of 9.0, and wherein said enzyme has an isoelectric point of about 6.8.

13. (New) The isolated enzyme according to claim 12, wherein said isolated enzyme is produced by a *Flammulina* basidiomycete.

14. (New) The isolated enzyme according to claim 13, wherein said *Flammulina* basidiomycete is a *Flammulina velutipes* basidiomycete.

15. (New) A composition comprising the enzyme according to claim 12.

16. (New) The composition according to claim 15 further comprising a dye.

17. (New) A method of dyeing, wherein said method comprises:

contacting an object with a dye in the presence of one or more enzymes according to claim 12, thereby dyeing the object.

18. (New) The isolated enzyme of claim 12, wherein said enzyme is secreted in culture medium comprising fungus bodies from which the enzyme is obtained.

19. (New) The isolated enzyme of claim 12, wherein the enzyme is extracted from a fungus body culture bed or a waste culture bed of basidiomycete.

20. (New) The isolated enzyme according to claim 12, wherein said isolated enzyme is from the *Flammulina velutipes* strain IFO 30601.